User's Manual:

Universal Communication Controller

Synchronous to Asynchronous Communication Interface

Software Revision 2.004b

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SyncMate
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Chapter 1
Introduction

Congratulations on purchasing your Universal Communication Controller from ADD-Engineering. The Universal Communication Controller combines dedicated communication hardware with on-board data processing software to provide an efficient means of interfacing asynchronous Data Terminal Equipment to synchronous Data Communication Equipment. By doing this the Universal Communication Controller off-load communications overhead from your Data Terminal Equipment's CPU for optimum system performance.

Functional Description

The Universal Communication Controller is a device that establishes the interface from standard asynchronous serial ports (the ones which are usually standard on computer systems) to standard as well as "non-standard" synchronous systems (non-standard in terms of Commercially Of The Shelf equipment). The UCC can interface 8 synchronous systems to 8 asynchronous systems simultaneously. Apart from the configurable "Universal-mode"[1], the UCC now also provides an HDLC and a transparent interface mode. To provide flexibility and create a wide adaptation level within these different modes, the UCC has a number of parameters which can be altered to interface to specific protocols. Synchronisation word, bit encoding and bit stripping are only a couple of these parameters. Though the UCC is designed from a total new concept, a lot of its functionality is comparable to that of the SyncMate and the ClockMate. The UCC provides more functionality, flexibility, stability, configurability, ease of installation and fault check mechanisms. Above all that the UCC also provides a mechanism to remote monitor/configure the unit by means of a serial terminal. System configuration security is guaranteed by a keylock that can disable access to menu's which affect the units behaviour.

1. Universal mode: only operating mode available on UCC's with a software revision prior to 2.004b

Specification Overview

DCE / Asynchronous Interface	
Ports	8
Connector	DB25 DCE (female)
Electrical Interface	RS-232
Speed	1200, 2400, 4800, 9600, 19k2 and 115k2 bps
Start/Stop bits	1
Data bits	8
Bit order	LSB-first, MSB-first
Flow control	CTS/RTS
Input buffer	128 bytes / 8kb (HDLC)
Output buffer	32 bytes / 16kb (HDLC)
Available signals	CTS, RTS, TxD, RxD, DTR, TxC (NA), RxC (NA), ExC (NA)
Invertable signals	CTS, RTS, TxD, RxD, DTR, TxC (NA), RxC (NA), ExC (NA)

Specification of DCE interface

DTE / Synchronous Interface	
Ports	8
Connector	DB25 DTE (male)
Electrical Interface	RS-232
Speed	600, 1200, 2400, 4800, 9600, 64k bps
Clock mode	Internal, Dpll, External
Clock source	input: TxC, RxC output: ExC

Specification of DTE interface

DTE / Synchronous Interface	
Flow Control	CTS
Sync Length	6...16 bits
Frame Length	1..1024 bytes
BIt Encoding	NRZ, !NRZ, NRZI, !NRZI
Sync Stripping/Insertion	On/Off
Bit Stripping/ Insertion	On/Off
SizeHeader	On/Off
Checksum Generation	Off/Xor/Xnor
Idle State	1, 0, Alternating
Available signals	CTS, RTS, TxD, RxD, DCD, DTR, TxC, RxC, ExC
Invertable signals	CTS, RTS, TxD, RxD, DCD, DTR, TxC, RxC, ExC

Specification of DTE interface

Control Port / Asynchronous	
Ports	1
Connector	DB9 DTE (male)
Electrical Interface	RS-232
Speed	9600 bps
Start/Stop bits	1
Data bits	8
Available signals	TxD, RxD, RTS, DTR, DSR, DCD, CTS

Specification of control port interface

Power Requirements	
AC Input	95V - 135V (110V switch position)
	180V - 265V (230V switch position)
Net Frequency	47 Hz - 63 Hz
Power Consumption	25 Watt

Power requirements

Display	
Type	LCD Super Twisted
Display pattern	2 * 40 characters
Backlight color	Green

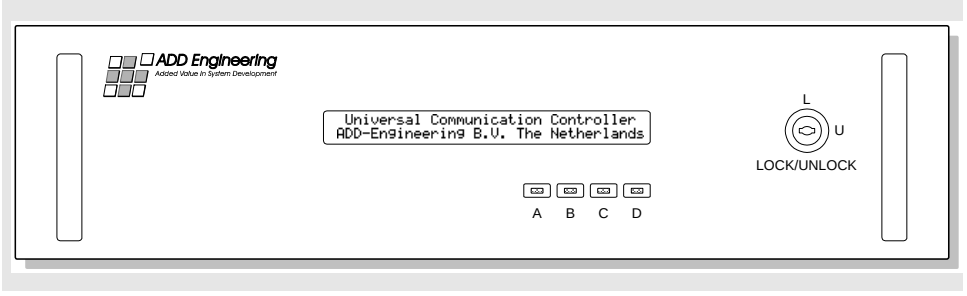
Display specifications

Dimensions	
Case	19 inch rack mountable unit
Width	19 inch (482.60 mm)
Height	3 HU (133.35 mm)
Depth	250 mm

Dimensions

Chapter 2
Controls and Display

The Universal Communication Controller is controlled by four front panel keys and via the 9 pin SUB-D connector on the back of the device (control port). To provide a means of disabling access to functions that could change the operation of the device a keylock has been installed. Input from the keyboard and output to the display is processed in exactly the same manner on the serial control port.



Front-panel of the UCC

Keyboard

The front panel keyboard contains four keys marked A, B, C, and D. The keys enable a user to step through the menu's. All the keys have their "serial"-equivalent (input on the control-port) that can be used simultaneously.

A - key

This key is the general Escape key, when a user wants to quit the current menu (and move one level up in the menu-hierarchy in the case that is possible). The “serial”-equivalent for this key is the “left-arrow” control key.

B - key

This key is the down/left key, when a user wants to move to the previous menu or previous value. The “serial”-equivalent for this key is the “down-arrow” control key.

C - key

This key is the up/right key, when a user wants to move to the next menu or next value. The “serial”-equivalent for this key is the “up-arrow” control key.

D - key

This key is the accept/enter-menu/toggle key, when a user wants to accept the selected value. However, in some menu’s the key is used to toggle “binary” values. The “serial”-equivalent for this key is the “right-arrow” control key.

Keylock

The keylock provides a means of control to disable access to menu’s/functions which can alter the operation of the device. Menu’s that do not enable the user to change the operation of the device will always be accessible.

Locked

The L is the Locked position. The user is granted access to the “Channel Diagnostics” and the “Controller Info” menu’s only. The user is not able to chenge the operational mode of the device, nor is the user able to view settings of the device.

Unlocked

The U is the Unlocked position. The user is granted access to all the menu’s, no restrictions apply.

Note:

In case you have lost both keys of your UCC's keylock, please contact ADD-Engineering for a new set of keys.

Display

The LCD with backlight contains information on the current selected menu/parameter and the selectable values. In general, the first row displays the parameter and the second row displays the selectable values. The output to the serial control port is identical (is a copy of) the information on the display.

Chapter 3
Preset Setup

Setting up presets enables the user to set up a kind of profiles for specific protocols or configurations. By setting up a preset (editing) and copy this preset to the channels which need to be configured as selected in the preset, the user can avoid the cumbersome job of setting up a number of channels with the same configuration. The latter also indicates that a preset's configuration can be copied to more than one channel.

Edit

Enables the user to edit the selected preset, editing the preset will not change configurations of channels which configuration was copied from this preset. Editing the selected preset will not change the correct functioning of the channels currently active.

A preset needs to be selected before the actual editing can be initiated.

The parameters which are selectable and configurable are the same as for the parameters in "Channel Setup". For a complete functional description of these parameters please see the "Channel Setup" chapter.

Copy

Enables the user to copy the selected preset to one of the eight channels, copying the preset **will change** configurations of the destination channel.

A preset needs to be selected before a destination channel can be selected.

Chapter 4
Channel Setup

The flexibility of the Universal Communication Controller allows a user to configure the device for a wide range of military and non-military protocols and electrical interfaces. The parameters that are variable and their effects in the behaviour of the UCC are described hereunder.

Channel Type

Channel type selects the type of “protocol” for that specific channel. **After selecting a specific channel type, the parameters that are of no use for the selected mode of operation are hidden.** Hence, there will be no menu-item displaying this parameter. The UCC provides 3 types of channels, Universal, HDLC and Transparant.

- Universal

  The standard operating mode used for processing different military protocols.

- HDLC

  The operating mode providing an interface to HDLC.

- Transparent

  The operating mode that provides a transparant interface from asynchronous to synchronous and vice versa.

Bit Encoding

Receiver

Bit-encoding for the receiver can be described as the way the line-state is decoded to a received bit. With the UCC it is possible to specify 4 different bit-encoding methods, NRZ, !NRZ, !NRZI and NRZI.

- NRZ

  Generally known as Non Return to Zero, the line-state is directly decoded to form a bit. A ‘1’ on the physical line is "decoded" to a bit with the value ‘1’. A ‘0’ on the physical line is "decoded" to a bit with the value ‘0’.

- !NRZ

  Almost the same as NRZ but in this case all bits are simply inverted. A ‘1’ on the physical line is "decoded" to a bit with the value ‘0’ in memory. A ‘0’ on the physical line is "decoded" to a bit with the value ‘1’.

- NRZI

  Generally known as Non Return to Zero Inverted. Although the name implies that it is just the inverted version of NRZ, there is a more significant difference between these two. To decode the line-state to a bit in NRZI requires knowledge of the previous line-state. If there is a difference between the previous line-state and the actual line-state then it is decoded to a bit with the value ‘0’. If there is no difference between the previous and the actual line-state then it is decoded to a bit with the value ‘1’. In short, transitions will be decoded to form a bit with the value ‘0’ and steady states will be decoded to form a bit with the value ‘1’.

- !NRZI

  Almost the same as NRZI but in this case all bits are simply inverted. Transitions will be decoded to form a bit with the value ‘1’ and steady states will be decoded to form a bit with the value ‘0’.

Transmitter

Bit-encoding for the transmitter can be described as the way the bits which need to be transmitted are encoded to a line state.

- NRZ

  Generally known as Non Return to Zero, the bit is directly encoded to form a line-state. A bit with the value ‘1’ is encoded to the physical line-state 1. A bit with the value ‘0’ is encoded to the physical line-state ‘0’.

- !NRZ

  Almost the same as NRZ but in this case all bits are simply inverted first. A bit with the value ‘1’ is encoded to the physical line-state ‘0’. A bit with the value ‘0’ is encoded to the physical line-state ‘1’.

- NRZI

  To encode the bit to transmit to a line-state in NRZI requires knowledge of the previous line-state. If a bit with the value ‘0’ needs to be encoded then the line-state should alter, so the actual line-state should be the inverted version of the previous line-state. If a bit with the value ‘1’ needs to be encoded the actual line-state should be the same as the previous line-state. In short, bits with the value ‘0’ will be encoded as transitions and bits with the value ‘1’ will be encoded as steady-states.

- !NRZI

  Almost the same as NRZI but in this case all bits are simply inverted first. In short, bits with the value ‘1’ will be encoded as transitions and bits with the value ‘0’ will be encoded as steady-states.

Bit Order

Receiver

For the receiver the bit-order can best be described as the order in which the synchronously received bits are submitted to the asynchronous receiver. The most commonly used bit-order is LSB-first, however some applications require the opposite.

- LSB-FIRST

The bit which is received first at the synchronous line will be placed at the LSB-position of the byte which will be submitted to the asynchronous receiver. No bit-reversal is taking place.

- MSB-FIRST

  The bit which is received first at the synchronous line will be placed at the MSB-position of the byte which will be submitted to the asynchronous receiver. In short it means that bit 0 becomes bit 7, bit 1 becomes bit 6 and so on.

Transmitter

For the transmitter the bit-order can best be described as the order in which the asynchronously received bytes are transmitted by the synchronous transmitter. The most commonly used bit-order is LSB-first, however some applications require the opposite.

- LSB-FIRST

  The bit at the LSB-position of the byte received at the asynchronous input will be transmitted first by the synchronous transmitter. No bit-reversal is taking place.

- MSB-FIRST

  The bit at the MSB-position of the byte received at the asynchronous input will be transmitted first by the synchronous transmitter. In short it means that bit 0 becomes bit 7, bit 1 becomes bit 6 and so on.

Sync Length

Receiver

With Sync-Length the number of bits which form the Sync-Pattern can be specified. Changes to the number of sync-bits will not erase the Sync-Pattern.. The Sync-Length is configurable in the range [6..16].

Transmitter

With Sync-Length the number of bits which form the Sync-Pattern can be specified. Changes to the number of sync-bits will not erase the Sync-Pattern, the pattern will be truncated. The Sync-Length is configurable in the range [6..16].

Sync Pattern

Receiver

The Sync-Pattern specifies the sync-word on which the receiver will synchronise. The sync-pattern is compared after bit-decoding takes place. When the Sync-Pattern has been received the device is considered to be in-sync. Bytes will now be submitted to the user asynchronously.

Transmitter

The Sync-Pattern denotes the start of a frame. The pattern will be transmitted if there are bytes in the internal buffer. If there are less bytes in the buffer than the specified frame-length, the UCC will transmit the bytes in the buffer and fill up the remaining bytes (which were not submitted) with idle bits. The Sync-Pattern is fully user definable.

Strip Sync

To provide the user with the possibility to strip or not strip the sync-word from the synchronously received data or to insert or not insert the sync-word into the synchronously transmitted data, this option is implemented in the UCC.

Receiver

- OFF

The synchronously received sync-word is submitted to the user via the asynchronous output. In case the bit-order is reversed the sync-word will also be reversed.

- ON

  The number of synchronisation bits are stripped from the synchronously received data. In other words the sync-word is stripped from the data.

Transmitter

- OFF

  Off in this context actually means no-insertion. No insertion of a sync-word takes place at the synchronous transmitter side. The user has to submit the sync-word via the asynchronous input port.

- ON

  On means that the sync-word is inserted by the UCC in case a new frame needs to be transmitted. The sync-word which is inserted is specified by the pattern "Sync-Pattern". The pattern should be read from left to right with the left bit transmitted first.

Frame-Length

The frame-length is selectable in the range of [1..1024]. In general the Frame-Length is the number of bytes the user will submit or can expect asynchronously. The latter with some exceptions which can be read hereunder.

Receiver

With the Fame-Length parameter the number of bytes which the user expects is specified. The number of bytes are submitted to the asynchronous side. All the bytes which are received are included in the Frame-Length. So, in case the sync-word is not stripped the Sync-Word will count as part of the total Frame-Length.

Transmitter

With the Frame-Length parameter the number of bytes which the user will submit is specified. In case the Sync-Word is not stripped, the Sync-Word should be submitted by the user via the asynchronous port and thus will

count as part of the Frame-Length. However, if a checksum-mode is selected, one byte less should be submitted while the UCC is generating its own checksum to be forwarded with the data.

Strip/Insert Bit

Bit stripping is better known as the term bit-stuffing. Specific bits are stripped from the data at the receiver's side and inserted at the transmitter's side.

Receiver

At the receiver's side (synchronous) the specified bit will be stripped from the data. The insert parameter in this menu is of no significance for the receiver's side. The bitposition parameter specifies which bit will be stripped after reception of the Sync-Word. Assuming the Sync-Word is found and the strip/insert parameter is set to bitposition '1', insert '0'. Then the first bit after the Sync-Word is stripped from the data (in case Sync-Stripping is also enabled), then the next 8 bits are forwarded to the asynchronous port and the next "first" bit is stripped from the data. This continues until all the bytes of the frame are received.

Transmitter

At the transmitter's side (synchronous) the specified bit will be inserted in the data. The insert parameter in this menu specifies if a '0' or a '1' will be inserted. Assuming the Sync-Word has already been transmitted (and sync-stripping is also enabled) and the strip/insert parameter is set to bitposition '1', insert '0'. Then the first bit transmitted after the sync-word will be a '0'. After that a byte which is submitted via the asynchronous port will be forwarded to the synchronous port and then another '0' will be inserted. This continues until all the bytes of the frame are transmitted.

SizeHeader

Size header is an option that is only used in HDLC to place the size of the HDLC-frame in front of the frame itself

Receiver

Places the size of the HDLC frame in front of the frame itself. Maximum size of the frame is 8192 bytes. The size header is a two byte value (actually 16 bits unsigned) with the MS-Byte being sent first. A user can determine the end of a HDLC frame by counting the number of bytes received and compare this to the size of the frame as “decoded” from the size-header.

Transmitter

The size-header parameter is of no significance in the transmitter.

Clock-source

With the UCC it is possible to select three different clock-sources. The first most commonly used is the external (EXT) clock-mode, the second is the internal (INT) clock-mode and the third and last is the digital pll (DPLL) clock-mode.

- INT

  The internal clock-mode is used when the UCC should generate the clocking signals required. The synchronous clock-speed can be selected from the Sync-Speed menu. The clock which is generated internally is placed on pin 24 (ETCLK) of the UCC.

- DPLL

  The digital pll clock-mode is used when synchronous data is coming in at a known synchronous bit-rate but not accompanied by a clock signal. The synchronous clock-speed can be selected from the Sync-Speed menu. The clock which is generated internally is placed on pin 24 (ETCLK) of the UCC. The internally generated clock is synchronised continuously with the received data, or better with the transitions in this data.

- EXT

  With the external clock-mode clock-signals should be connected to the UCC at pin 17 (RCLK) and pin 15 (TCLK). The RCLK is timebase related to the data on pin 3 (RxD) and the TCLK is timebase related to the data on pin 2 (TxD). The TCLK and RCLK need not to be related, however usually they are.

Receiver

Data is clocked in at the rate specified by the clock-signal.

Transmitter

Data is clocked out at the rate specified by the clock-signal.

Sync Speed

The Sync-Speed parameter of the UCC has only significance if INT (internal) or DPLL (digital phase locked loop) is enabled. In other cases the transmit/receive clock submitted will dictate the synchronous speed. Thus,

when using external clock, the user is not limited by the selection of sync-speeds down here. However, there is an upper-limit to the external supplied synchronous clock which is 9600.

- 600
  Data is clocked in and out at 600 Bps.
- 1200
  Data is clocked in and out at 1200 Bps.
- 2400
  Data is clocked in and out at 2400 Bps.
- 4800
  Data is clocked in and out at 4800 Bps.
- 9600
  Data is clocked in and out at 9600 Bps.
- 64K
  Data is clocked in and out at 64 KBps.

Receiver

Data is clocked in at the selected speed.

Transmitter

Data is clocked out at the selected speed.

Idle-State

The idle-state is used to specify the behaviour of the transmitter in the case that there are no bytes to transmit. The idle-state is directly related to the line-state and thus no bit-encoding will take place. There are three possible idle-states, ‘0’, ‘1’ and ALT.

Receiver

This parameter is of no significance for the receiver.

Transmitter

- ‘0’

Idle in zero's, invalid for NRZI and !NRZI bit encoding methods.

- '1'
  Idle in one's, invalid for NRZI and !NRZI bit encoding methods.
- ALT
  Idle in alternating states, normally this is used to keep receivers with DPLL in sync.

Checksum-Mode

Checksums can be generated by the UCC, it means that the user does not have to calculate checksums over the data submitted to the UCC. The checksum is transmitted as the last byte of a frame. The checksum-mode has three options, OFF, XOR and XNOR.

Receiver

The checksum-mode parameter is of no significance in the receiver.

Transmitter

The checksum calculated using the method defined above is attached to the frame as a last byte.

- OFF
  No checksum is attached to the frame
- XOR
  An XOR (exclusive or) will be performed over all the bytes in the frame (except the sync-word).
- XNOR
  An XNOR (inverted exclusive or) will be performed over all the bytes in the frame (except the sync-word).

Async-Speed

The speed selected in this menu is used to transmit and receive asynchronous data via the asynchronous ports. Regardless of the settings in this menu, the control port of the UCC will always come up with 9600 Bd., this is fixed and can not be changed.

- 1200

Asynchronous bitrate is 1200, No Parity, 8 Bits, 1 Stop bit.

- 2400
  Asynchronous bitrate is 2400, No Parity, 8 Bits, 1 Stop bit.
- 4800
  Asynchronous bitrate is 4800, No Parity, 8 Bits, 1 Stop bit.
- 9600
  Asynchronous bitrate is 9600, No Parity, 8 Bits, 1 Stop bit.
- 19200
  Asynchronous bitrate is 19200, No Parity, 8 Bits, 1 Stop bit.
- 115K2
  Asynchronous bitrate is 115200, No Parity, 8 Bits, 1 Stop bit.

Receiver

The asynchronous receive rate.

Transmitter

The asynchronous transmit rate.

Signal Polarity DCE

The polarity of the data, status and clock signals (although clock signals are not available at the channel's DCE side) is selectable in this menu.

- RX
  The RxD line can be inverted (pin 2)
- TX
  The TxD line can be inverted (pin 3)
- RTS
  The RTS line can be inverted (pin 4)
- CTS
  The CTS line can be inverted (pin 5)
- DTR
  The DTR line can be inverted (pin 20)
- TXC

The TxC line can be inverted (pin 15), currently of no significance

- RXC
  The RxC line can be inverted (pin 17), currently of no significance
- EX
  The ETX line can be inverted (pin 24), currently of no significance

Transmitter

The inversion of data signals, clock signals or status signals has no special consequences except the ones a user might expect from the setting.

For instance if the user inverts the TxD line, it is logical that other systems connected to the device will not be able to communicate with the UCC anymore when these devices use the standard polarity (note: not the data on the line gets inverted but the line gets inverted, so start and stop bits will be inverted to!).

Receiver

The inversion of data signals, clock signals or status signals has no special consequences except the ones a user might expect from the setting.

Signal Polarity DTE

The polarity of the data, status and clock signals is selectable in this menu.

- RX
  The RxD line can be inverted (pin 3)
- TX
  The TxD line can be inverted (pin 2)
- RTS
  The RTS line can be inverted (pin 4)
- CTS
  The CTS line can be inverted (pin 5)
- DTR
  The DTR line can be inverted (pin 20)
- CD
  The CD line can be inverted (pin 8)

- TXC
  The TxC line can be inverted (pin 15)
- RXC
  The RxC line can be inverted (pin 17)
- EX
  The ETX line can be inverted (pin 24)

Channel Mode

Channel Mode allows a user to disable/enable one of the eight channels on the UCC.

- Active
  The channel is active and fully functional.
- Down
  The channel is powered down, the synchronous DTE side of the channel will not produce a clocking signal (internal, dpll mode). The asynchronous DCE side of the channel will hold CTS logic low (the connected device is not allowed to send data).

Transmitter

See general description.

Receiver

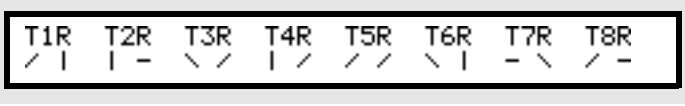
See general description.

Chapter 5
Channel Diagnostics

The Universal Communication Controller has a number of built in features which reflect the actual state of the channels.The UCC has per channel based statistics and above that a general all channel overview. Both features can be very helpful in resolving/detecting a problem.

All Channels

This menu provides the user with a general overview of the status of all channels at once. It is selected by selecting ALL at the “Channel Diagnostics” menu.



Display contents when selecting Channel Diagnostics ALL

T

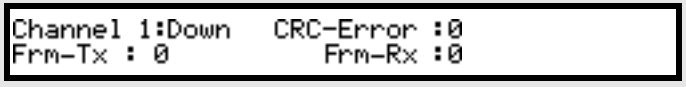
Indicates the synchronous transmitter of the channel. If the indicator below the T is rotating the synchronous transmitter is transmitting a frame. If the indicator is blinking ‘-’ on and off then the CTS line of the synchronous transmitter is disabled. No data can be send on the synchronous channel if this situation exists. Make sure RTS is connected to CTS and that the signals are not inverted by means of “DTE Channel Polarity”.

R

Indicates the synchronous receiver of the channel. If the indicator below the R is rotating the synchronous receiver is receiving a frame.

Per Channel HDLC

This menu provides the user with a more detailed channel based overview. It is selected by selecting one of the eight possible channels at the “Channel Diagnostics” menu



Display contents when selecting Channel Diagnostics of one HDLC-channel

Channel

Indicates the selected channel for which the statistics are valid. The number behind “Channel” could be in the range of 1..8.

Down

Reflects the channel mode, this could be Down and Active.

CRC-Error

Indicates the number of CRC-errors that occurred on that particular channel. The CRC that is used on the HDLC channels is the standard CRC-CCITT (16 bits).

Frm-Tx

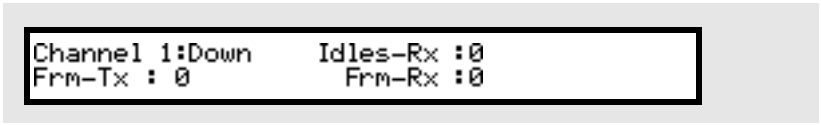
Reflects the number of frames already transmitted. For every frame submitted through the asynchronous DCE port this counter should increment with one.

Frm-Rx

Indicates the number of frames already received. An increment at this counter means that another frame is submitted to the asynchronous DCE port by the UCC.

Per Channel Universal/Transparent

This menu provides the user with a more detailed channel based overview. It is selected by selecting one of the eight possible channels at the “Channel Diagnostics” menu



Display contents when selecting Channel Diagnostics of one channel

Channel

Indicates the selected channel for which the statistics are valid. The number behind “Channel” could be in the range of 1..8.

Down

Reflects the channel mode, this could be Down and Active.

Idles-Rx

Indicates the number of bytes which are received but were not part of a frame or a synchronisation word. If the line is in idle-state (and clocks are configured correctly) this counter should increment. For the transparent channel-type the Idles-Rx will not increment durring reception because in transparent mode the unit can not distinguish frames from idles.

Frm-Tx

Reflects the number of frames already transmitted. For every frame submitted through the asynchronous DCE port this counter should increment with one.

Frm-Rx

Indicates the number of frames already received. An increment at this counter means that another frame is submitted to the asynchronous DCE port by the UCC. When using the transparent channel-type the Frm-Rx indicates the number of **bytes** received on the synchronous interface.

Chapter 6
Controller Info

The Universal Communication Controller has a built-in menu item for determining the software revision and serial number of the device. This menu is called the "Controller Info"-menu. The information displayed in this menu can be very helpful in case of particular problems. It allows the customer service group at ADD-Engineering to determine the specific details of your system.



Display contents when selecting Controller Info

Bios Rev

Indicates the bios revision in the BBB field.

Application Rev

Indicates the application revision in the AAAAA field.

Device Serialnumber

Indicates the 10 digit serial number of the device in the DDDDDDDDDD field.

Chapter 7
Performance Info

The Universal Communication Controller has a built-in menu item for monitoring the CPU-load during operation of the unit. Since the UCC is highly optimized for its tasks the CPU-load displayed in this menu will probably be less than 50 % with all synchronous channels running on 64k and asynchronous channels running on 115k2. Do not be alarmed if the CPU-load indicates 0.0 % !



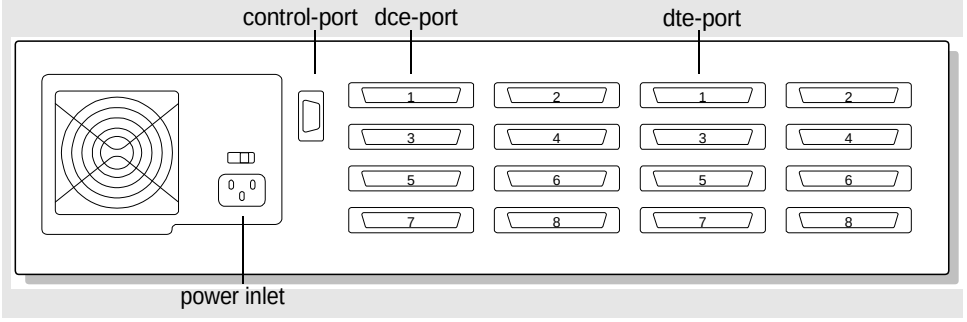
Display contents when selecting Performance Info

CPU-load

Indicates the CPU-load in percents, the load is also displayed by the bar-graph on the second line of the display.

Chapter 8
Connecting the UCC

The back-panel of the Universal Communication Controller has a large number of connectors. There are female (socket) DB25 connectors, male (plug) DB25 connectors and a male (plug) DB9 connector. The DB25 connectors are grouped by “equipment” type. The male (plug) connectors represent the DTE (Data Terminal Equipment) function of the channels and the female (socket) connectors represent the DCE (Data Communication Equipment) function of the channels. The DB9 connector represents the control-port which enables remote-control. A description of these connectors together with the power-inlet connector is given in this chapter.



Back-panel of the UCC

Power

The power to the UCC is delivered through a IEC/EURO style power inlet. Operating voltage can be switched to 110V/60 Hz as well as to 220 V/50 Hz. Before connecting the UCC to the mains-power, make sure the correct selection has been made for the operating voltage.

Note

Impoper selection of the operating voltage (in relation to the mains-power) causes damage to the unit.

Control Port

The control port is the male DB9 connector. The port enables the user to have the same functionality as with the local front panel keyboard and display, however the controls can now be remote. By connecting a remote VT100 (or VT100 emulating) terminal settings can be changed and diagnostics can viewed remote. However, settings can never be changed in case the keylock is on lock (L) position. Communication to the remote terminal is asynchronous with the following settings: 9600 Bd, 8 bits, no parity, 1 stop bit. This configuration can not be changed. Pinouts of the control port can be found in the appendices

DTE Ports

The DTE-ports are the male DB25 connectors. The ports are called DTE-ports because the pinning is exactly as on a DTE device. The DTE ports are all synchronous. These are the ports which in most configurations interface to a modem (DCE-device). DTE-port number 1 is connected internally to DCE-port number 1 to form a channel, DTE-port number 2 is connected internally to DCE-port number 2, etc. Pinouts of the DTE-ports can be found in the appendices.

Note

For correct operation of the UCC, it is of major concern that the CTS signal inputs on the DTE-ports (pin 5) have a defined value which indicates Clear To Send, either CTS is tied to RTS (pin 4) directly or CTS is tied to the CTS output

of the modem. In case the CTS signal is not asserted, the unit will not be able to send any data synchronously. Such a situation will be indicated on the display by a blinking '-' (see Channel Diagnostics).

DCE Ports

The DCE-ports are the female DB25 connectors. The ports are called DCE-ports because the pinning is exactly as on a DCE device. The DCE ports are all asynchronous. These are the ports which in most configurations interface to a computer-serial port (DTE-device). DCE-port number 1 is connected internally to DTE-port number 1 to form a channel, DCE-port number 2 is connected internally to DTE-port number 2, etc. Pinouts of the DCE ports can be found in the appendices.

Appendix A
Warranty and Maintenance

Warranty Information

Hardware

All ADD-Engineering B.V.'s hardware products are covered by a one year warranty from the original date of purchase. Warranty coverage includes:

Telephone support. Free phone support on any hardware product for one year after initial product purchase. ADD-Engineering's Customer Service and Support (CSS) hours are 9:00 am to 5:00 pm, Monday through Friday.

Rapid replacement. Upon CSS phone verification of hardware failure within the first 90 days after purchase, ADD-Engineering will issue a return material authorization (RMA) number for rapid replacement. If the failed unit is in stock, a replacement unit will be shipped within one business day. If the failed unit is not in stock, it will receive the highest priority for repair once ADD-Engineering receives the unit.

Extended maintenance option. Extends the standard warranty coverage, including rapid replacement, to three years when purchased within 90 days of initial product purchase.

Out of warranty repair service is available for a per-product flat fee. Typical turnaround for out-of-warranty repairs is four to six weeks from date of factory receipt.

Limited Hardware Warranty. ADD-Engineering warrants its hardware products to be free from defect in materials and workmanship. ADD-Engineering will repair or replace (at its option) all defective product returned freight pre-paid, in original packaging, to its factory in Rotterdam, The Netherlands within one (1) year. ADD-Engineering reserves the right to ship replacement units from our inventory of reconditioned units. All other warranties, expressed or implied, are limited to the restrictions of this warranty. Product abuse, alteration, or misuse invalidates all warranties. This warranty does not cover damages incurred by natural or electrical forces exceeding the stated product specifications. In no event will ADD-Engineering's warranty liability exceed the purchase price of the product. No liability is assumed for any consequential damages resulting from the use of any ADD-Engineering product.

This warranty is in lieu of all other warranties, including but not limited to the warranties of merchantability and fitness for a particular purpose. National, state and local laws may offer rights in addition to those stated above.

Product Information Worksheet

Please record the following information about your Universal Communication Controller.

UCC Serial number:

Purchase date:

Appendix B
Cables and Connectors

This appendix provides necessary background information for making connections to the serial ports on the UCC. It discusses modem and null modem connectors, the standard RS-232 pinouts, and describes some typical cables

Two terms used frequently throughout this appendix are

- Data Communication Equipment (DCE)
- Data Terminal Equipment (DTE)

DCE peripheral devices usually refer to modems
DTE devices include terminals, computers and printers.

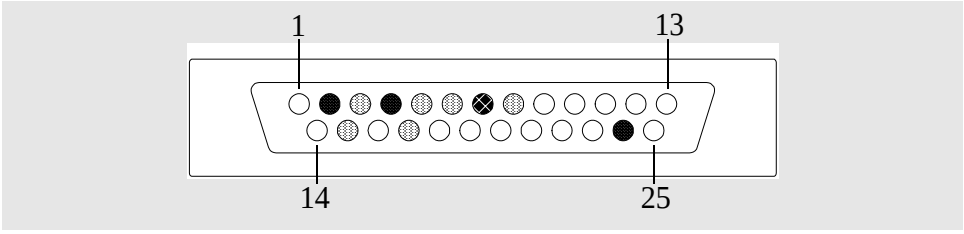
Cabling Overview

To connect a peripheral device to the Universal Communication Controller, you need an interface cable to run electrical signals from one of the DB-25 connectors to the peripheral device. ADD-Engineering does not supply this cable. You can purchase ready-made cables at your local computer store or make them on your own

DCE and DTE devices send and receive signals through different pins. The UCC is at one side configured to be a DCE device and on the other side to be a DTE device. In general, when connecting a DCE-device to the DTE-interface of the UCC and when connecting a DTE-device to the DCE-interface of the UCC, use straight through cables.

Serial Connector Pinouts

Terminals, modems and printers typically communicate through an RS-232 (serial) interface. All of the Universal Communication Controller's **synchronous** ports are DTE type RS-232 compatible serial connectors.



Serial connector Pin Diagram (male DTE)

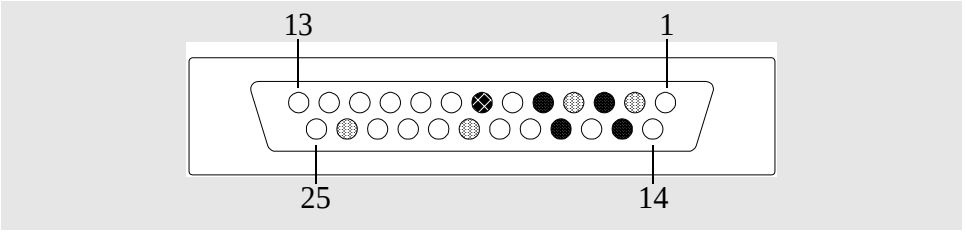
Pin Number	RS-232 Signal	V.24 Signal	Direction
2	TxD	103	Output
3	RxD	104	Input
4	RTS	105	Output
5	CTS	106	Input
6	DSR	107	Input
7	Signal GND	-	None
8	DCD	109	Input
20	DTR	108/2	Output
15	TxCin	114	Input
17	RxCin	115	Input
24	TxCout	113	Output

Serial connector Pinout (male DTE)

Signal	Description
TxD	Transmit Data. Sends data to peripheral device
RxD	Receive Data. Receives data from the peripheral
RTS	Request To Send. Signal asking if peripheral device is ready to receive data
CTS	Clear To Send. Signal from the peripheral device indicating readiness to accept data
DSR	Data Set Ready. Signal from the peripheral indicating the status.
Signal GND	Signal Ground. Provides reference level for other signals
DCD	Data Carrier Detect. Signal indicating that the peripheral device has detected a signal from the remote peripheral device over the datacommunications channel
RxCin	Receive Data Clock. Input for receiver signal element timing from a synchronous DCE-device.
TxCin	Transmit Data Clock. Input for transmitter signal element timing from a synchronous DCE-device
DTR	Data Terminal Ready. Indicates that the local device is ready to communicate
TxCout	Transmit Data Clock. Output for transmitter signal element timing generated on the UCC.

Pin Signal Description

All of the Universal Communication Controller’s asynchronous ports are DCE type RS-232 compatible serial connectors.



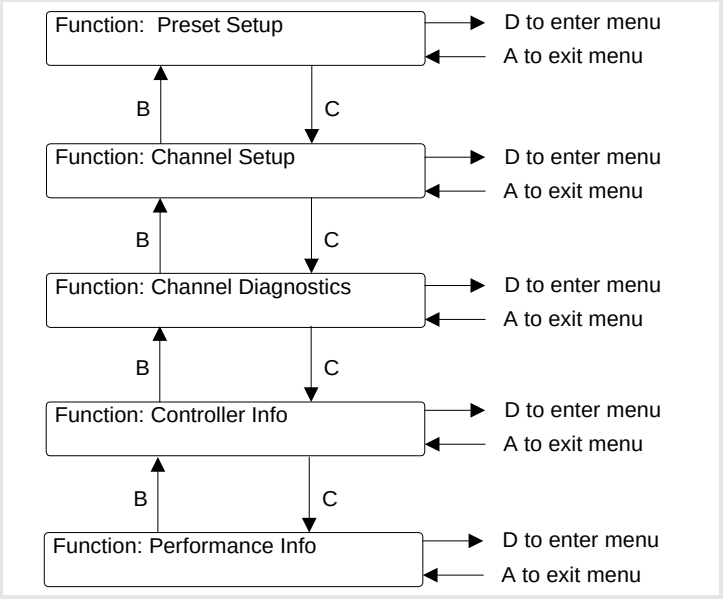
Serial connector Pin Diagram (female DCE)

Pin Number	RS-232 Signal	V.24 Signal	Direction
2	RxD	103	Inputt
3	TxD	104	Output
4	RTS	105	Input
5	CTS	106	Output
7	Signal GND	-	None
20	DTR	108/2	Input
15	TxCin	114	NA
17	RxCin	115	NA
24	TxCout	113	NA

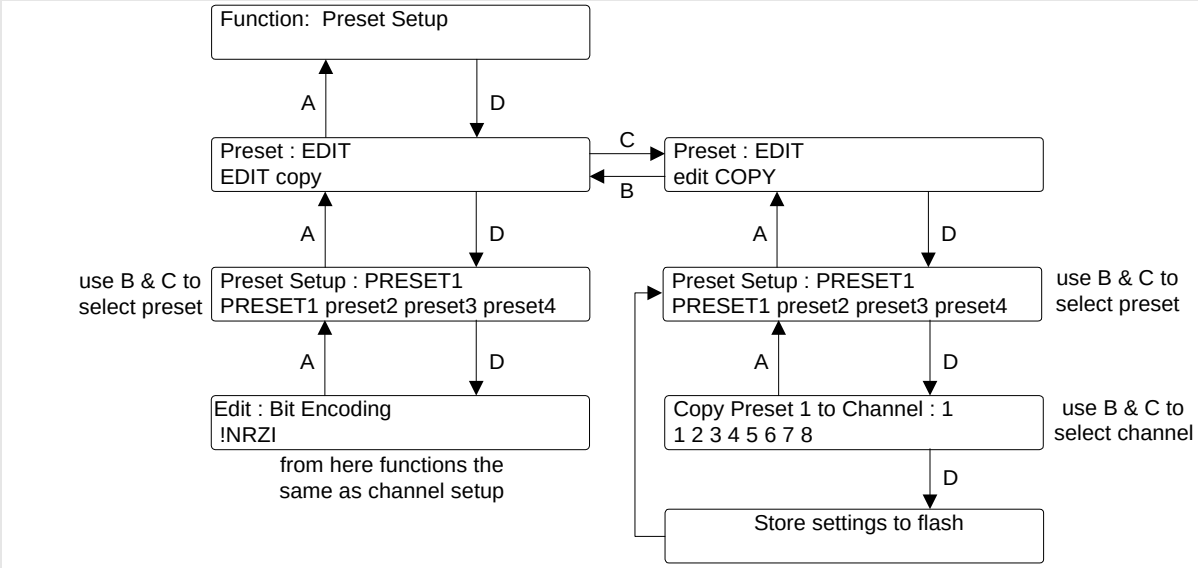
Serial connector Pinout (female DCE)

Appendix C
Menu Structure

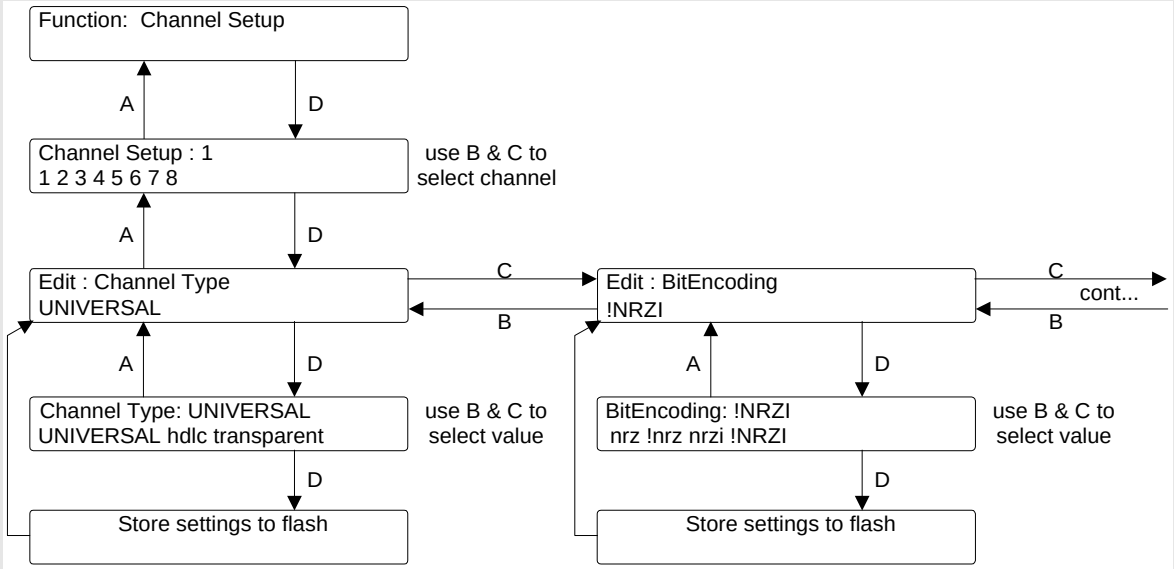
The menu structure of the Universal Communication Controller is almost self-explaining. However, for reference, a detailed overview is given in this appendix. The structure is given in the form of diagrams. For every transition from one menu to another menu the key (from the keyboard) is given as a condition for that transition



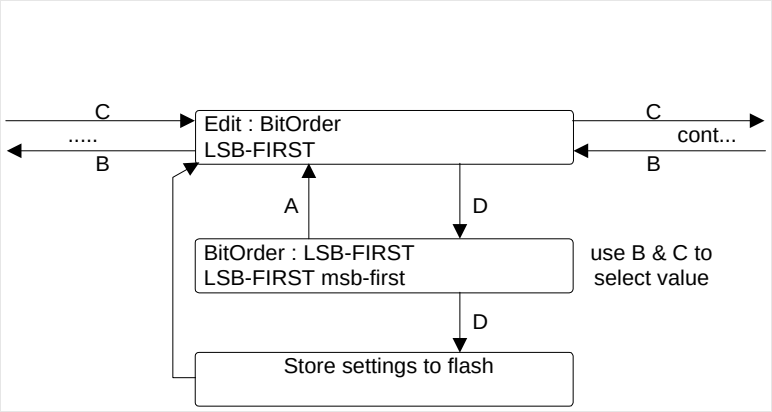
Main Menu Structure



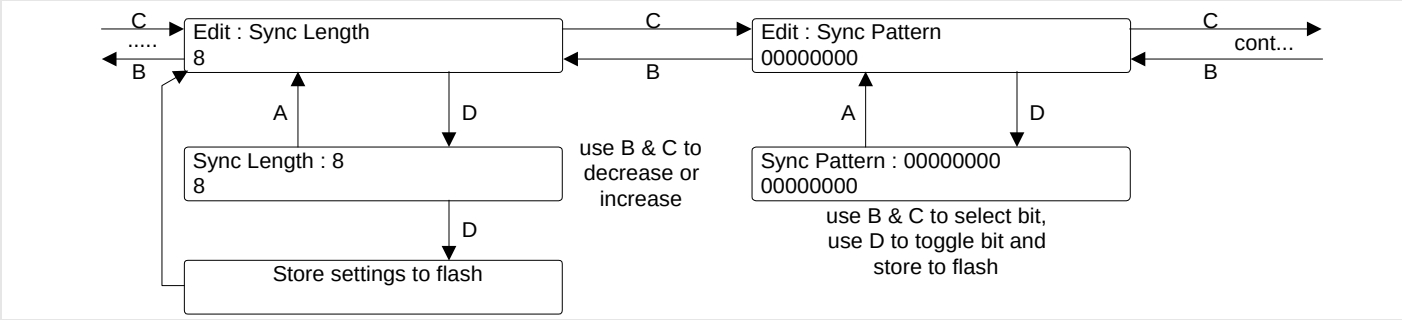
Preset Setup Menu Structure



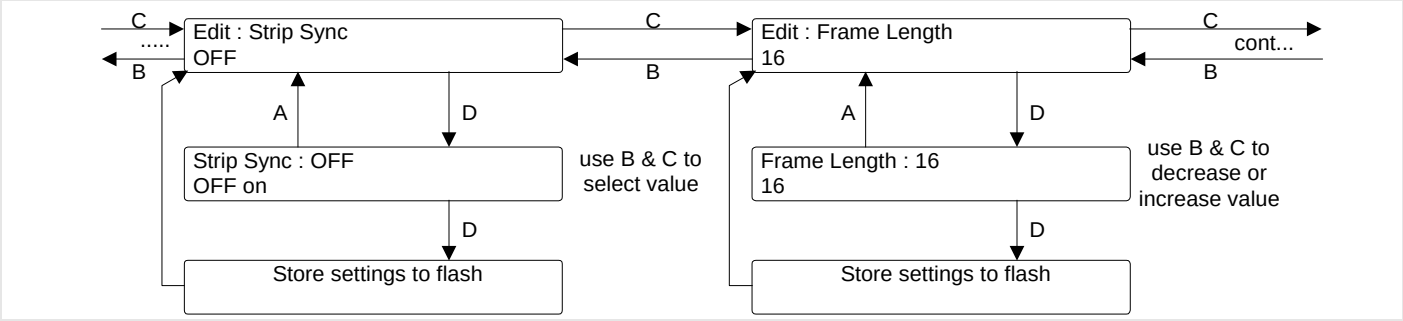
Channel Setup Menu Structure-1



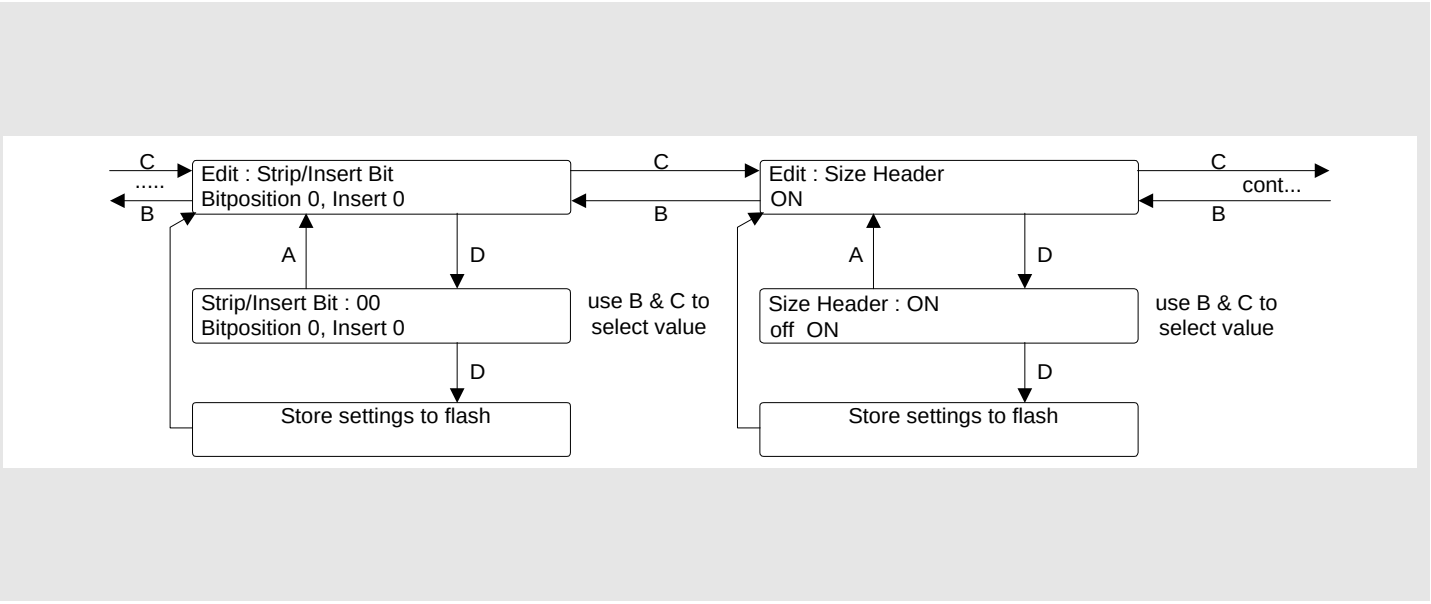
Channel Setup Menu Structure-2



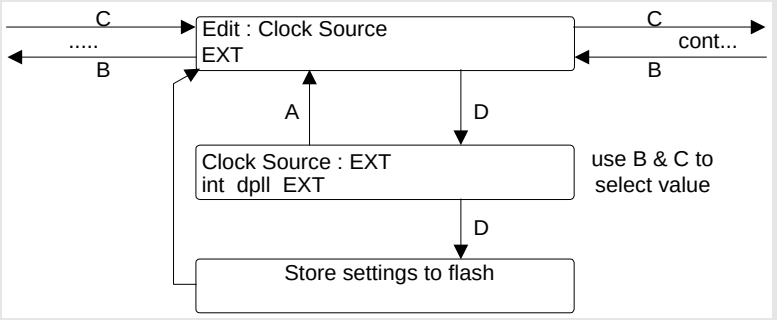
Channel Setup Menu Structure-3



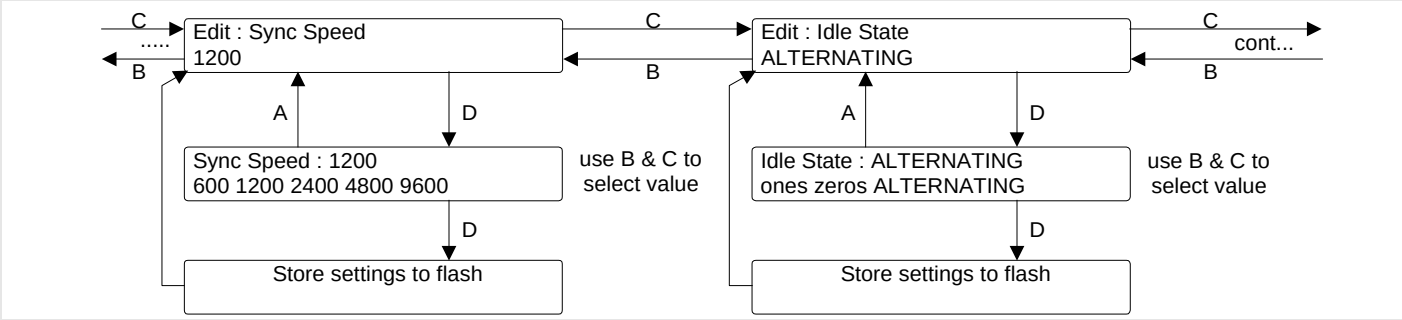
Channel Setup Menu Structure-4



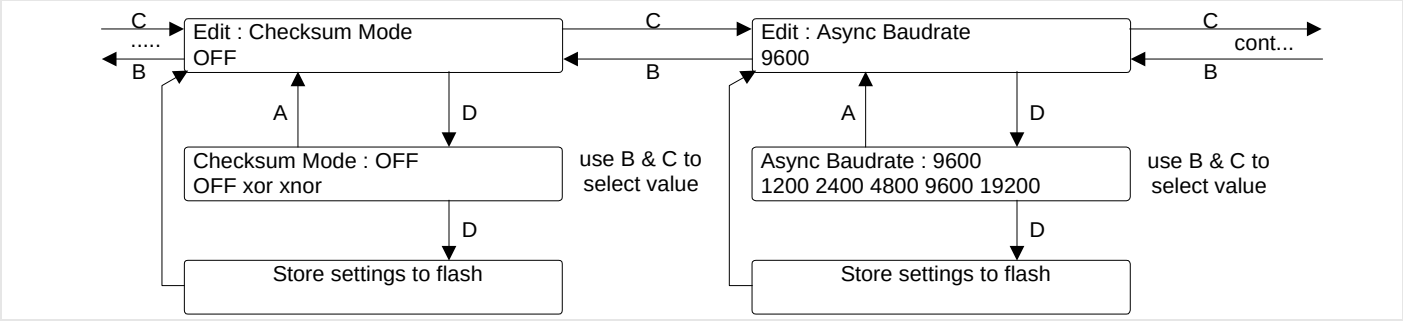
Channel Setup Menu Structure-5



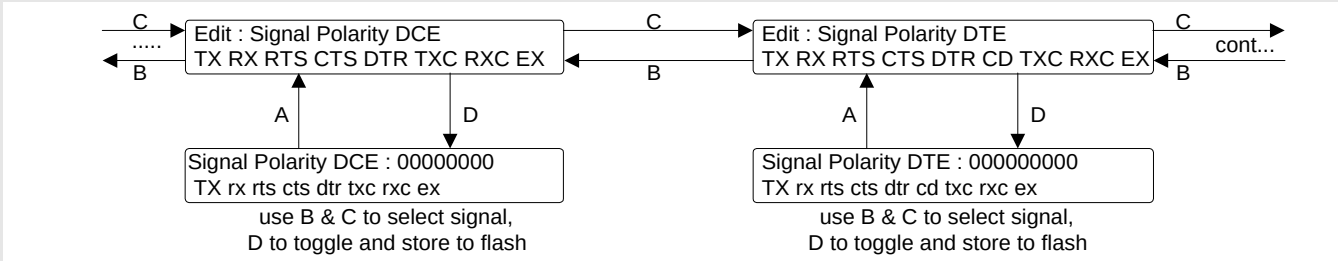
Channel Setup Menu Structure-6



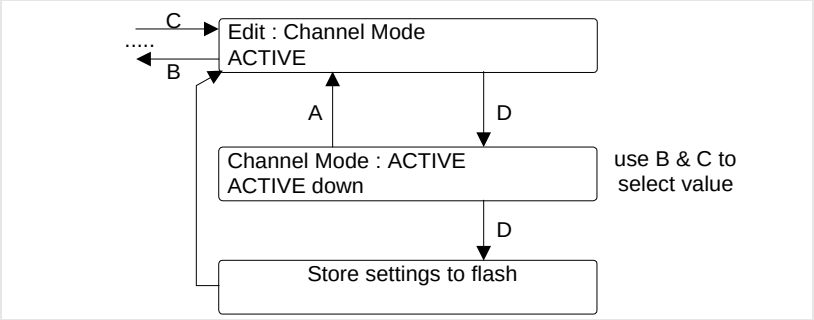
Channel Setup Menu Structure-7



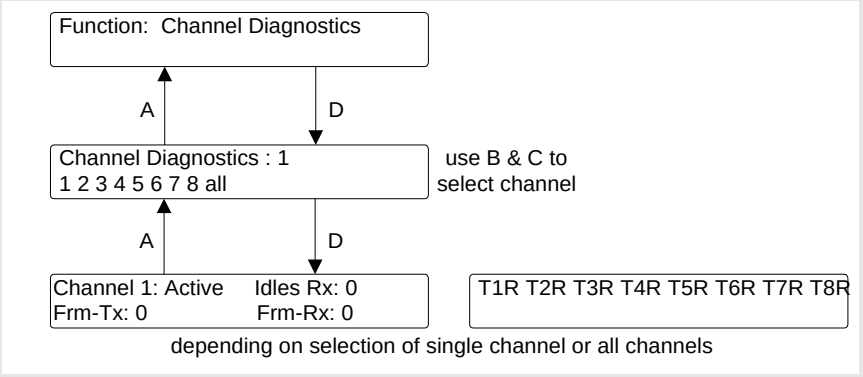
Channel Setup Menu Structure-8



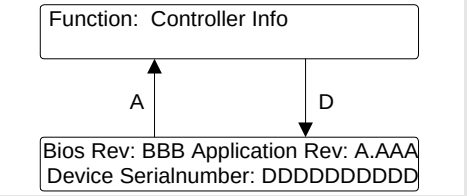
Channel Setup Menu Structure-9



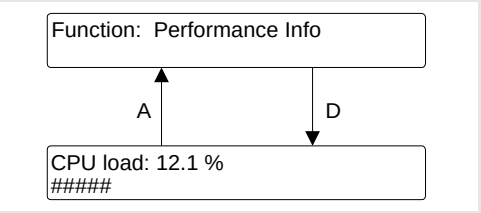
Channel Setup Menu Structure-10



Channel Diagnostics Menu Structure



Controller Info Menu Structure



Performance Info Menu Structure

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